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ST. LAWRENCE SEAWAY AND POWER PROJECT

PREPARED FOR THE

COMMITTEE ON FOREIGN RELATIONS

UNITED STATES SENATE

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PREFACE BY SENATOR ALEXANDER WILEY

The formal dedication of the St. Lawrence Seaway and power projects on June 26, 1959, symbolized the fraternal cooperation of the United States and Canada in the development of a power and transport complex of tremendous economic benefit to millions of American and Canadian citizens. The seaway may well bring about the beginning of a new industrial golden age if its full potential is realized.

These projects constitute living monuments to practical international cooperation. Four separate agencies, representing two national governments, a State agency, and a Provincial agency, have constructed a magnificent engineering project over a period of nearly 5 years. Cooperating, one with the other, coordinating their activities at every step, overcoming common obstacles, these agencies have achieved the fulfillment of a centuries-old dream. They well deserve the applause of their grateful fellow countrymen.

By the expenditure of approximately $1 billion these four agencies have opened to the commerce of the world 300,000 square miles in the heart of the two countries and harnessed the third largest single block of hydroelectric power in the world. The twin benefits of low-cost transportation and low-cost electric power provide a great potential for industrial growth and development.

The Great Lakes Basin possesses a wealth of natural resources; it is adjacent to a large concentration of population and industrial production, and is served by the necessary transportation services. Fresh water, amply available in the basin, is important for human consumption, navigation, and the development of power and industrial capabilities. The 10 States and 2 Provinces contiguous to the Great Lakes and accessible to the St. Lawrence Seaway are the locale of some 60,000 operating industrial plants employing nearly 6 million workers in the United States. Approximately one-half of Canada's population and probably a larger proportion of Canadian industry is to be found in this area.

The power project has already inaugurated a remarkable industrial growth within its power market area. New industries are being drawn into the region, attracted by the large block of reliable low-cost power.

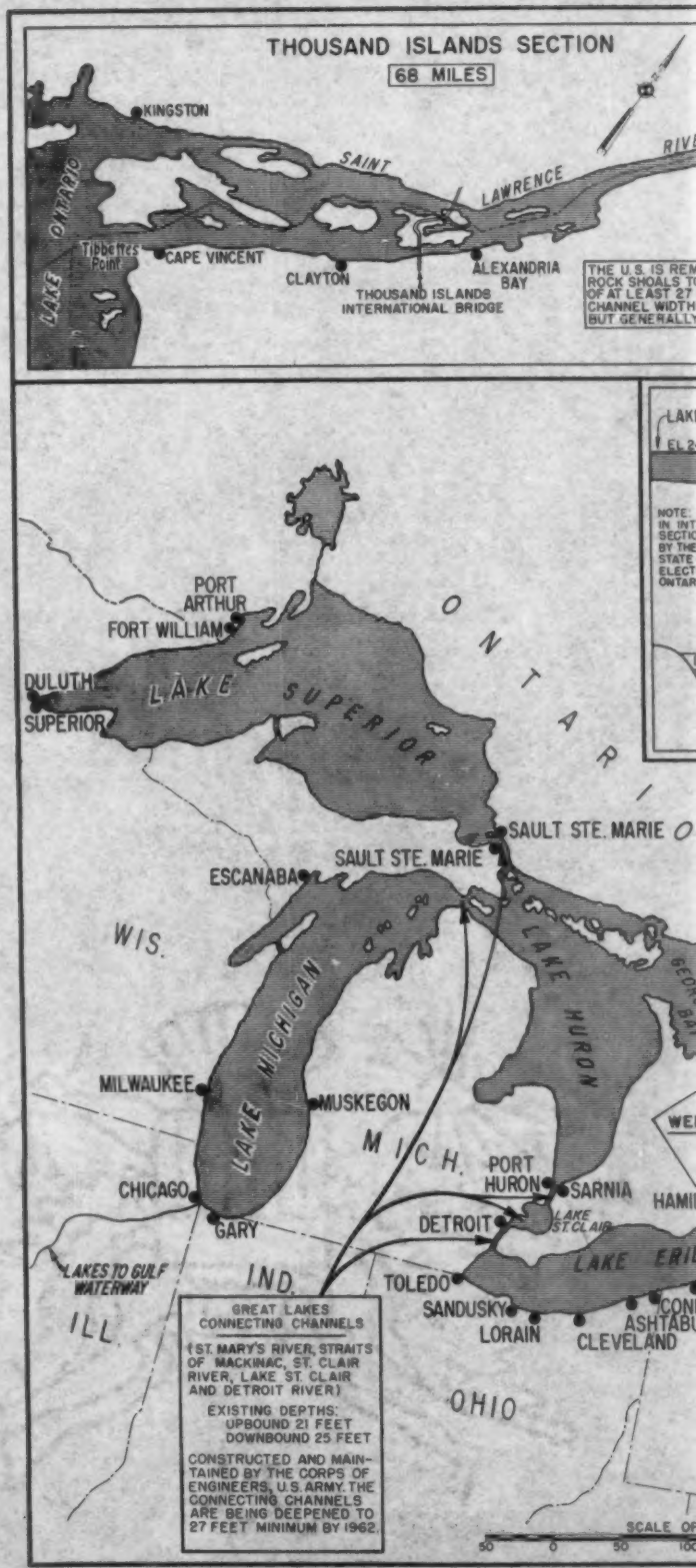
The successfully completed power project is truly a tribute to the spirit of friendly cooperation which has prevailed throughout. One concrete evidence is the fact that the power-generating plant consists of a single structure with only a small bronze tablet to mark the dividing line between the facilities belonging to each of the two great countries. Another is the absolute sharing of the costs of construction, dollar for dollar.

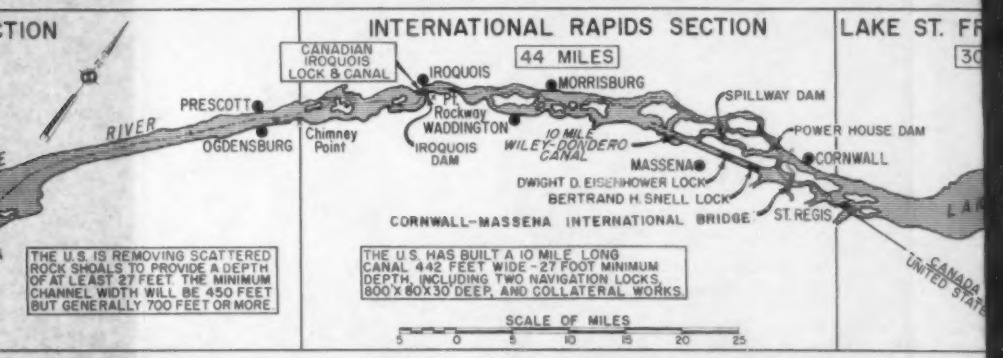
Another remarkable feature in common to the two projects is that they will cost the taxpayer nothing since proceeds from the sale of power and toll charges will repay the entire costs.

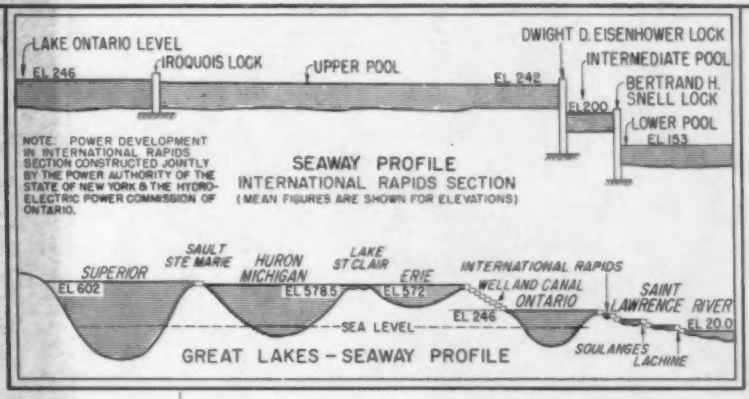
These projects present the remarkable genius of the free enterprise of two great countries with a great opportunity and challenge to realize their full potential. It will not be an easy and simple task; there will be many problems; it will take time and the expenditure of much effort and money. If fully utilized, however, the seaway and its power projects may accomplish as much, or more, for the United States and Canada than was accomplished by the Suez and Panama Canals for the world.

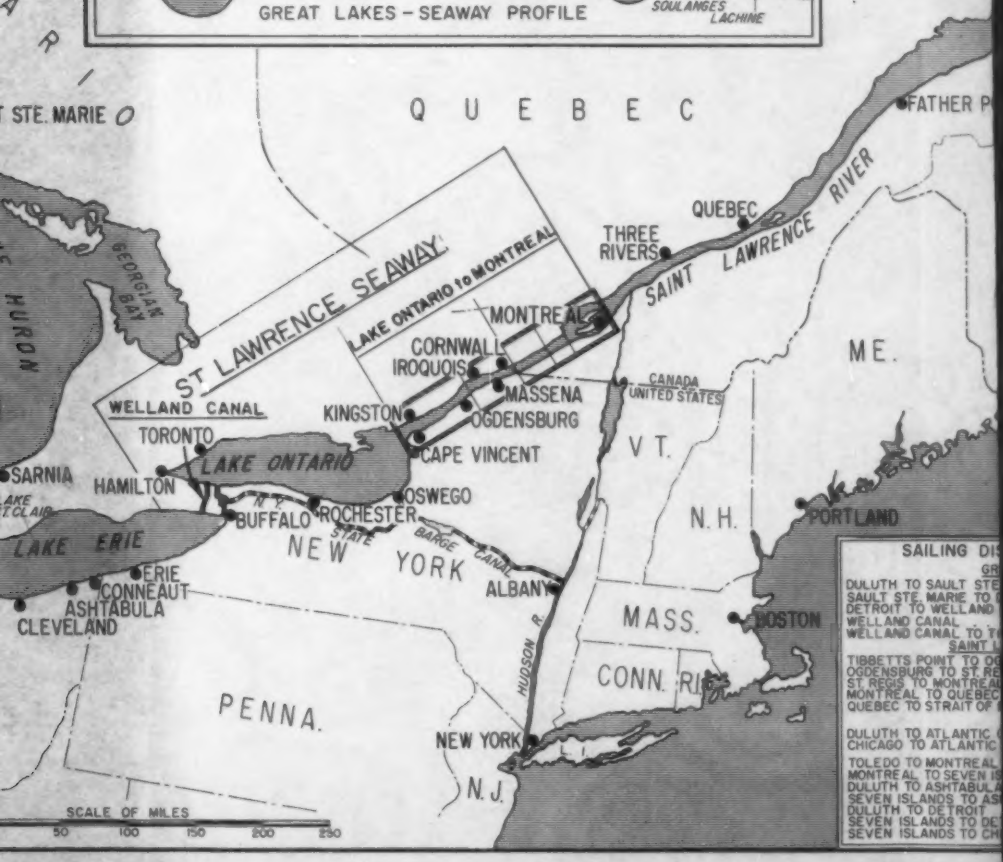
As a sponsor of the seaway law, Public Law 83–358, I, along with my colleagues in the Congress of the United States, feel deeply gratified by the rapid completion of this magnificent undertaking which we endorsed only 5 short years ago. I should like to dedicate this pamphlet prepared by the Legislative Reference Service of the Library of Congress to all of those, both Canadian and American, who have helped to realize this achievement of determined and understanding human endeavor.

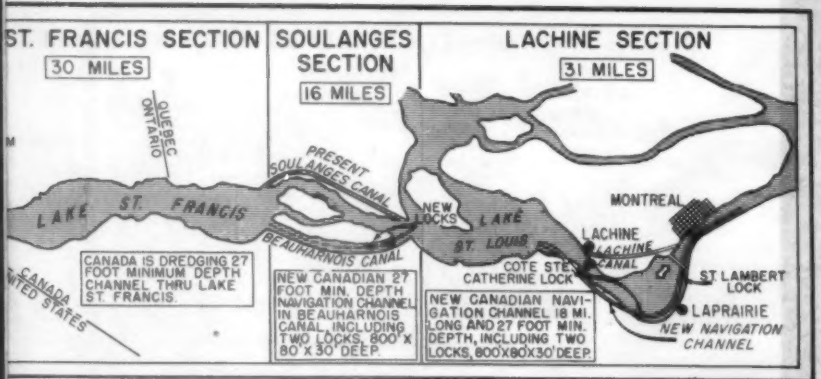
Senator ALEXANDER WILEY.


THOUSAND ISLANDS SECTION
68 MILES
KINGSTON
SAINT
LAWRENCE
RIVE
LAKE ONTARIO
Tibbetts Point
CAPE VINCENT
CLAYTON
ALEXANDRIA BAY
THOUSAND ISLANDS INTERNATIONAL BRIDGE
THE U.S. IS REM
ROCK SHOALS TO
OF AT LEAST 27
CHANNEL WIDTH
BUT GENERALLY
LAKE
EL 2
NOTE:
IN INT
SECTIO
BY THE
STATE
ELECT
ONTAR
PORT ARTHUR
FORT WILLIAM
DULUTH
SUPERIOR
LAKE SUPERIOR
ONTARI
SAULT STE. MARIE
SAULT STE. MARIE
ESCANABA
WIS.
LAKE MICHIGAN
LAKE HURON
MILWAUKEE
MUSKEGON
MICH.
PORT HURON
SARNIA
CHICAGO
GARY
DETROIT
LAKE ST CLAIR
LAKE ERI
LAKES TO GULF WATERWAY
IND.
TOLEDO
SANDUSKY
LORAIN
CLEVELAND
ILL.
OHIO
GREAT LAKES CONNECTING CHANNELS
(ST. MARY'S RIVER, STRAITS OF MACKINAC, ST. CLAIR RIVER, LAKE ST. CLAIR AND DETROIT RIVER)
EXISTING DEPTHS:
UPBOUND 21 FEET
DOWNBOUND 25 FEET
CONSTRUCTED AND MAINTAINED BY THE CORPS OF ENGINEERS, U.S. ARMY. THE CONNECTING CHANNELS ARE BEING DEEPENED TO 27 FEET MINIMUM BY 1962.
SCALE OF
50 0 50 100


INTERNATIONAL RAPIDS SECTION
44 MILES
CANADIAN IROQUOIS LOCK & CANAL
IROQUOIS
MORRISBURG
PRESCOTT
RIVER
OGDENSBURG
Chimney Point
Pt. Rockway
WADDINGTON
IROQUOIS DAM
10 MILE WILEY-DONDERO CANAL
SPILLWAY DAM
POWER HOUSE DAM
CORNWALL
MASSENA
DWIGHT D. EISENHOWER LOCK
BERTRAND H. SNELL LOCK
CORNWALL-MASSENA INTERNATIONAL BRIDGE
ST. REGIS
CANADA
UNITED STATES
THE U.S. IS REMOVING SCATTERED ROCK SHOALS TO PROVIDE A DEPTH OF AT LEAST 27 FEET. THE MINIMUM CHANNEL WIDTH WILL BE 450 FEET BUT GENERALLY 700 FEET OR MORE.
THE U.S. HAS BUILT A 10 MILE LONG CANAL 442 FEET WIDE - 27 FOOT MINIMUM DEPTH, INCLUDING TWO NAVIGATION LOCKS, 800'X 80'X 30' DEEP, AND COLLATERAL WORKS.
SCALE OF MILES
5 0 5 10 15 20 25


LAKE ONTARIO LEVEL
EL 246
IROQUOIS LOCK
UPPER POOL
EL 242
DWIGHT D. EISENHOWER LOCK
INTERMEDIATE POOL
EL 200
BERTRAND H. SNELL LOCK
LOWER POOL
EL 153
NOTE: POWER DEVELOPMENT IN INTERNATIONAL RAPIDS SECTION CONSTRUCTED JOINTLY BY THE POWER AUTHORITY OF THE STATE OF NEW YORK & THE HYDRO-ELECTRIC POWER COMMISSION OF ONTARIO.
SEAWAY PROFILE
INTERNATIONAL RAPIDS SECTION
(MEAN FIGURES ARE SHOWN FOR ELEVATIONS)
SUPERIOR
EL 602
SAULT STE MARIE
HURON MICHIGAN
EL 578.5
LAKE ST CLAIR
ERIE
EL 572
INTERNATIONAL RAPIDS
WELLAND CANAL
ONTARIO
EL 246
SAINT LAWRENCE RIVER
EL 20.0
SEA LEVEL
SOULANGES
LACHINE
GREAT LAKES - SEAWAY PROFILE


N
QUEBEC
FATHER P
ST. MARIE
GEORGIAN BAY
HURON
ST LAWRENCE SEAWAY
LAKE ONTARIO to MONTREAL
WELLAND CANAL
MONTREAL
CORNWALL
IROQUOIS
MASSENA
OGDENSBURG
KINGSTON
TORONTO
CAPE VINCENT
LAKE ONTARIO
SARNIA
HAMILTON
OSWEGO
BUFFALO
ROCHESTER
N.Y. STATE BARGE CANAL
NEW YORK
ALBANY
LAKE ERIE
ERIE
CONNEAUT
ASHTABULA
CLEVELAND
PENNA.
NEW YORK
N.J.
HUDSON R.
THREE RIVERS
QUEBEC
SAINT LAWRENCE RIVER
CANADA
UNITED STATES
ME.
VT.
N.H.
PORTLAND
MASS.
BOSTON
CONN. RI
SAILING DIS
GR
DULUTH TO SAULT STE
SAULT STE. MARIE TO
DETROIT TO WELLAND
WELLAND CANAL
WELLAND CANAL TO
SAINT L
TIBBETTS POINT TO OG
OGDENSBURG TO ST. RE
ST. REGIS TO MONTREAL
MONTREAL TO QUEBEC
QUEBEC TO STRAIT OF
DULUTH TO ATLANTIC
CHICAGO TO ATLANTIC
TOLEDO TO MONTREAL
MONTREAL TO SEVEN IS
DULUTH TO ASHTABULA
SEVEN ISLANDS TO AS
DULUTH TO DETROIT
SEVEN ISLANDS TO DE
SEVEN ISLANDS TO CH
SCALE OF MILES
50 100 150 200 250



ILING DISTANCES IN MILES

GREAT LAKES	
SAULT STE. MARIE	394
MARIE TO DETROIT	332
WELLAND CANAL	244
ANAL	28
ANAL TO TIBBETTS POINT	159
SAINT LAWRENCE RIVER	
OINT TO OGDENSBURG	68
G TO ST. REGIS	46
MONTREAL	68
TO QUEBEC	160
STRAIT OF BELLE ISLE (ATLANTIC OCEAN)	843
ATLANTIC OCEAN	2,342
ATLANTIC OCEAN	2,250
MONTREAL	600
TO SEVEN ISLANDS	484
ASHTABULA	880
NDS TO ASHTABULA	950
DETROIT	730
NDS TO DETROIT	1,090
NDS TO CHICAGO	1,723

MAP OF

GREAT LAKES-SAINT LAWRENCE SEAWAY PROJECTS

ISSUED BY

SAINT LAWRENCE SEAWAY DEVELOPMENT CORPORATION

LEWIS G. CASTLE
Administrator

M. W. OETTERSHAGEN
Deputy Administrator

Construction of the Seaway Project, Lake Erie to Montreal, is being performed as indicated above by
The Saint Lawrence Seaway Development Corporation of the United States
and
The St. Lawrence Seaway Authority of Canada

43239 O - 59 (Face p. 1)

ST. LAWRENCE SEAWAY AND POWER PROJECT

I

INTRODUCTION

Strictly speaking, the St. Lawrence Seaway project provides for the construction of a 27-foot waterway in the St. Lawrence River to permit the passage of deep-draft vessels between Lake Ontario and the Atlantic Ocean and for the concurrent development of the International Rapids section of the river for hydroelectric power. However, with the present deepening of the Welland Canal connecting Lakes Ontario and Erie, and the improvement of the connecting channels between the upper Great Lakes, which are to be completed by 1962, the seaway may be thought of as a 2,300-mile deepwater (27 feet) artery stretching from the Atlantic Ocean to the far reaches of Lake Michigan and Lake Superior. The most direct economic stimulus of the new seaway will be felt by the 17 States which either border the Great Lakes or are generally regarded as tributary to the waterway area.

The project has been undertaken cooperatively by the Governments of the United States and Canada. The St. Lawrence Seaway Development Corporation was created by an act of Congress on May 13, 1954, for the purpose of constructing, operating, and maintaining those features of the project within the limits of the United States which are designed for the purpose of navigation. The Corporation was authorized to incur a bonded indebtedness of $140 million (all bonds to be held by the U.S. Treasury), the proceeds from which are to be used for construction of the seaway and necessary administrative expenses, including interest on the bonded indebtedness. The St. Lawrence Seaway Authority created, by an act of Parliament of Canada December 21, 1951, to construct, operate, and maintain those features of the project in Canadian territory, was organized in July 1954.

The authority and responsibility for development of the power of the seaway project has been assumed by the Power Authority of the State of New York and the Hydroelectric Power Commission of Ontario on a joint, equal share basis.

Major features of the American part of the project include the removal of shoals in the Thousand Islands section of the St. Lawrence River; construction of the 10-mile Wiley-Dondero Canal in the International Rapids section which incorporates the Bertrand H. Snell and Dwight D. Eisenhower locks; channel excavation in the South Cornwall Channel; construction of a high-level suspension bridge over the latter channel; and lesser works which include protective dikes, roads, and buildings. The U.S. Army, Corps of Engineers was designated by the U.S. Corporation as its agent for design and actual construction of the navigation facilities.

The Canadian Authority is responsible for that portion of the seaway extending from Montreal to the International boundary. This includes the Lachine section with its two locks, the St. Lambert and Cote Ste. Catherine, and new channel bypassing the Lachine Rapids; the Soulanges section, including a newly excavated channel in the Beauharnois Canal with two locks to bypass the Soulanges Rapids; a new channel through Lake St. Francis; the International Rapids section, including the North Cornwall Channel, Iroquois Canal and lock; and, finally, improvement of the Welland Canal to conform in dimensions to the rest of the seaway.

The 22 locks required to navigate the old 14-foot canal system have now been supplanted with 14 of greater capacity. The locks are of nearly uniform size—approximately 800 feet long, 80 feet wide, and 30 feet deep; and the channel, from Montreal to Lake Erie, will have a controlling depth of 27 feet.

Both countries began work on their sections of the seaway in mid-1954 and, by mid-1959, with minor exceptions, the facilities were completed.

The legislation authorizing the construction of the seaway provided for the liquidation of the cost of construction and the costs of operation and maintenance by the proceeds from a system of toll charges to be levied upon the vessels which use the seaway. Both nations have agreed upon a schedule of tolls which went into effect upon the opening of the 1959 navigation season. This is a new departure for the United States. Hitherto, by tradition, federally-constructed navigation works have been open to use free of charge.

II

HISTORICAL BACKGROUND

It was on a pleasant summer day, August 10, 1535, that Jacques Cartier, with his little flotilla of three vessels, sailing in search of the ever nebulous "Northwest Passage" to the Indies, first saw the broad waters of the mouth of a magnificent river. Because it was on St. Lawrence Day he named it after that saint. For 1,000 miles he sailed upstream but was stopped by a series of rapids now known as the Lachine Rapids. It was those rapids, and others found upstream, that for many years held men and their ships at bay.

A great civilization grew up around the river and the Great Lakes which form a vast reservoir providing a constant flow of water through the St. Lawrence Valley to the sea. Yet always the rapids, which had stopped Cartier from reaching the Indies, continued to prevent oceangoing vessels from sailing from the Atlantic to the prosperous hinterland.

Although small canals were built at an early period to enable canoes laden with goods and furs to bypass the rapids, with varying degrees of success, it was nearly three centuries after Cartier first sighted the silvery waters of the St. Lawrence before serious efforts were made to provide a through water traffic system.

In 1783 a canal was constructed to bypass the rapids separating Lake St. Francis and Montreal, but it was not until 1825 that the Lachine Canal was completed. Work was begun on the Welland Canal in 1824, and there followed several decades of canal building. Between 1824 and 1848 there followed in succession the Cornwall Canal, an improved Lachine Canal, the Williamsburg Canals, and the Beauharnois Canal. Together, these provided a through route inland to Lake Erie, but only for shallow-draft ships that could negotiate a 9-foot channel.

It was not until 1904 that all sectors of the canal system were improved to 14 feet in depth and provided with 270-foot locks, to conform with the improved Welland Canal. Ships requiring 14 feet of water could finally penetrate into the heartland of America and Canada.

Long before this, for well over a century, there had been considerable discussion of a major ship canal from the Atlantic to mid-America. Many different routes had been suggested, such as: by way of Hudson Bay; by Georgian Bay through the Ottawa River to the St. Lawrence; by the lower lakes and the St. Lawrence; and across the State of New York to the Hudson River.

The modern movement which finally reached its culmination June 26, 1959, is believed by most people to have begun when the Governments of Canada and the United States appointed a Deep Waterways Commission in 1895 to study and report on all possible waterways which might connect the Great Lakes and the Atlantic. The American members recommended an All-American waterway of 21-foot draught when they reported on June 30, 1900.

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In 1901 a small hydroelectric plant of 7,500 horsepower was constructed at Massena, N.Y. The power potentiality of the great volume of water rushing down the picturesque St. Lawrence Valley was pointed up forcibly by the U.S. Chief of Engineers, Gen. W. H. Bixby, in March 1911. In a newspaper interview given at that time he noted that improvements in the St. Lawrence River between Ogdensburg and Montreal could develop between 4 and 5 million horsepower of hydroelectric energy. From that moment, the power aspect of the St. Lawrence project was considered to be a primary element of any overall plan of development.

The International Boundary Treaty between the United States and Canada was signed on January 11, 1909. This established the International Joint Commission, composed of representatives of the two nations, with jurisdiction over matters affecting the boundary waters of the two countries. This Commission was to play a prominent role in negotiations over the seaway during the next 45 years.

The U.S. Senate adopted a resolution July 10, 1913, requesting the President to enter into negotiations for an international agreement for the improvement of navigation in the United States-Canadian boundary waters. This was followed by a note to Canada suggesting submission to the International Joint Commission for study the question of development of boundary waters for navigation and power.

Although Canada did not reply, the Hydroelectric Power Commission of Ontario began detailed studies of St. Lawrence power possibilities. These were completed in 1921 and a statement was presented by the commission to the International Joint Commission on the power potential.

Popular sentiment for a seaway among the citizens of Canada and of the United States had been growing sufficiently in the first quarter of the century, so that in 1919 two organizations were established primarily to stimulate interest in the development of the seaway but also to further the hydroelectric phase of the St. Lawrence project. These were the Canadian Deep Waterway & Power Association and the Great Lakes Tidewater Association. The two groups, with growing nationwide membership, remained very active in the movement which led ultimately to the actual authorization and construction of the dual project.

The New York State Legislature in March 1930 created the St. Lawrence Power Development Commission to study and develop plans for the development of St. Lawrence power. In 1931, following the report of the commission favoring the development of power in the International Rapids section by the State of New York, the State legislature established the Power Authority of the State of New York. The latter was directed to ask the Congress of the United States to effect the arrangements necessary for developing the power potential of the St. Lawrence. After 22 years of sustained effort this action was brought to fruition.

Largely as a result of the optimistic report of the Hydroelectric Power Commission of Ontario to the International Joint Commission in 1921, the Joint Commission recommended the appointment of a Joint Board of Engineers to determine the best manner of developing St. Lawrence power. Such a board was appointed in 1924 with three representatives for each nation.

The Joint Board of Engineers reported in 1926 that both the seaway and power projects were feasible. On the basis of this report negotiations were begun in 1930 and culminated in the signing of the St. Lawrence Deep Waterway Treaty of 1932. The treaty provided for a two-dam system and a 27-foot channel to be built as a joint endeavor. However, it was never ratified by the U.S. Senate.

The same year, 1932, the Welland Canal was officially opened with an improved depth of 25 feet in the locks and 30 feet over the sills, and the Dominion of Canada entered into an accord with the Province of Ontario for the latter to develop the power phase of the St. Lawrence project.

The Senate Committee on Foreign Relations held extensive hearings on the treaty of 1932, between November 14, 1932, and February 10, 1933. By a vote of 15 to 5 the committee reported on February 23, 1933, in favor of ratification of the treaty subject to agreements and interpretations set forth in an exchange of notes with Canada dated January 13, 1933. The committee approved of the accord reached between the U.S. Army, Corps of Engineers, and the Power Authority of the State of New York whereby the State would dispose of the power to be developed at the International Rapids section in return for reimbursement of a portion of the costs. The full Senate did not act on the treaty in 1933.

The House of Representatives on April 26, 1933, following hearings and a favorable report by the Committee on Interstate and Foreign Commerce, approved by a vote of 224 to 171 a House joint resolution permitting the use of the water of the St. Lawrence River for generation of power by the State of New York in accord with the terms of the treaty of 1932, and the accord recommended by the Corps of Engineers. However, the Senate defeated the same resolution by a vote of 59 to 20.

The treaty was again brought up for action in the Senate in 1934. Despite President Roosevelt's urgent recommendation that the projects be authorized and the treaty of 1932 be approved, and the submission of a favorable report entitled "St. Lawrence Water" by an Interdepartmental Board on the Great Lakes-St. Lawrence Project, the Senate failed to ratify the treaty (46 voting aye and 42 voting nay) after lengthy debate in January and February.

The Power Authority of the State of New York continued its study of all aspects of the power project. It completed a study of the cost of distribution of power to be generated by the project. The State Legislature of New York also authorized municipalities within the State to undertake the generation and distribution of electric power if a referendum of their citizens approved.

In 1935, the Federal Power Commission, upon concluding a national power survey, gave its stamp of approval for construction of the power project because of the need for power in territory contiguous to the power site. The National Resources Board Water Planning Committee added its approval in late 1934. The National Resources Committee followed with a report to the President on December 1, 1936, urging construction of the seaway and power project as a high priority national public works program.

Following the failure of the U.S. Senate to ratify the treaty of 1932, a new version was submitted to Canada by the United States in 1938, which sought to remove the elements in the former treaty objected

to by many opponents. Canada agreed to discussions concerning the new provisions, and engineering representatives met during 1940. In October of that year it was announced that the two nations had agreed to set up joint advisory and engineering committees to start preliminary work in the International Rapids section in order to obviate unnecessary delay on the entire project.

At the same time President Roosevelt directed the Federal Power Commission and the Corps of Engineers to make preliminary engineering surveys and investigations at the International Rapids section. Special defense funds were allocated for the purpose.

Canada by order in Council established a temporary Great Lakes-St. Lawrence Basin Committee to meet with the U.S. St. Lawrence Advisory Committee, appointed by the President to advise the Federal Power Commission and the Corps of Engineers, and also a board of engineers to meet with its U.S. counterpart. The first joint meeting was held at Massena, N.Y., October 31, 1940. The Corps of Engineers at once opened a district office at Massena and utilized Public Works Administration funds to conduct preliminary engineering work.

In December 1940 the U.S. Department of Commerce released a comprehensive study of the economic effects of the St. Lawrence waterway and power project. This was the work of N. R. Danielian, then Director, St. Lawrence Service, who later became president of the Great Lakes-St. Lawrence Association. The report was entirely favorable to construction of the project and focused wide attention on its value to the Nation.

During January 1941 the "Joint Report of the Temporary Great Lakes-St. Lawrence Committee (Canada) and the Advisory Committee (United States)" and the "Final Report of the Board of Engineers" gave evidence that the two nations had reached agreement on the essential physical features of the project works. The result was the signing at Ottawa of an executive agreement, subject to approval by concurrent legislation of the two countries, providing for the construction of the works on the International Rapids section and for the completion of the navigation improvements in the other sections of the Great Lakes-St. Lawrence system by 1948. It contained many of the provisions of the 1932 treaty. It provided for a 27-foot waterway from the head of the Great Lakes to Montreal; and for a combined power-navigation scheme in the international section of the St. Lawrence River, the power to be developed in a controlled single stage project yielding 2,200,000 horsepower divided equally between the two countries.

The Dominion of Canada and the Province of Ontario signed collateral arrangements renewing the 1932 accord on construction of the power project.

Meanwhile, agreement was reached by the Corps of Engineers, subject to approval of Congress and the Legislature of the State of New York, on a formula of cost allocation derived from the 1933 Federal-State accord. This agreement established an allocation of $93,375,000 to the Power Authority of the State of New York which, plus interest, was to be repaid to the Federal Government over a period of 50 years from operation of the self-liquidating power project in the International Rapids section.

The executive agreement was submitted to the Congress by the President with a message strongly urging its approval. However, in

the 11 years the agreement was before the Congress it was neither approved nor rejected. In 1942, S. 1385, which incorporated the agreement, was introduced by Senator George Aiken, of Vermont, and cosponsored by other Senators and referred to the Senate Committee on Commerce. However, the hearings which followed were limited to the question of whether the whole matter might better be left to a treaty between the two countries. No report was made to the full Senate on this bill. Proponents in the Senate attempted to have the substance of S. 1385 approved as an amendment to the rivers and harbors bill but were defeated by a vote of 56 to 25.

World War II then occupied the attention of the Congress for several years and sentiment for a St. Lawrence project was temporarily shelved. However, with the conclusion of the war attention was again focused upon the possibility of constructing the project as part of the postwar public-works programs which were advocated to take up the slack in the economy of the country expected to follow the withdrawal of military contracts from the Nation's industry.

At the close of World War II, seaway proponents had reconsidered ways and means of making a new campaign for authorization of the seaway. Senator Arthur Vandenberg stated that he would once more undertake to provide leadership for the seaway project in the Senate. He pointed out, however, how imperative it would be to give the project what he called a "new look." He suggested that, faced with a staggering national debt, an economy-minded Congress, and a notable trend toward conservatism, the best hope for the project would be to offer it to Congress as a self-liquidating venture, with the capital costs to be recaptured from the sale of power and by the assessment of nominal tolls on ships and cargo using the seaway.

Senator Vandenberg stated that if this principle were acceptable, he would undertake sponsorship of the legislation. All of the leading proponents of the seaway project were called into consultation, all recognized the reality of the situation, and all pledged their support to the principle of self-liquidation as advanced by Senator Vandenberg. From 1945 until 1954, when the seaway bill was passed, this principle was advanced at all hearings and in all educational material published on behalf of the seaway. It was a vital factor in securing favorable action.

It became evident in the late 1940's that the richest and more easily available iron ores of the western Great Lakes area were in fact limited in extent, and that in the future these ore supplies would be of diminishing importance. Some thought was given to moving the iron and steel industry from the Midwest to the Atlantic seaboard area where it would have ready access to overseas iron ore. Fortunately, a new source of rich iron ore was discovered in eastern Quebec and adjoining Labrador. Ore from this new high concentration source, brought to the shore of the lower St. Lawrence River could then be shipped by an improved St. Lawrence Seaway to the Middle West and obviate the necessity of removing most of the iron and steel industry from there. This was one more very potent reason for developing the seaway.

On October 2, 1945, shortly after VJ–day, Senator Alben Barkley was joined by other Senators in introducing Senate Joint Resolution 104 to approve the 1941 Executive Agreement. President Truman characterized the proposed development as one of the great construc-

tive projects of the North American continent, delayed only by the exigencies of war, and called upon Congress for speedy approval. After hearings, the Senate Committee on Foreign Relations, by a vote of 14 to 8, reported the resolution favorably. But no further action was taken during that Congress.

Meanwhile, the Army Corps of Engineers in 1942 had completed and released its final and detailed engineering study of the project. This was altered somewhat in detail, and cost data was revised in 1946; but in general the project as built and completed in 1959 is essentially that proposed in the 1942 report.

Efforts to develop the hydroelectric power potential of the St. Lawrence were stepped up in 1947–48. In late April 1948 there were conferences between representatives of the International Joint Commission, the Federal Power Commission, the Corps of Engineers, and the Power Authority of the State of New York. As a result, the power authority and the Hydroelectric Power Commission of Ontario sought approval of the International Joint Commission, under the treaty of 1909, of their cooperative plan for the development of the hydroelectric power at the International Rapids section of the river. The power authority also applied to the Federal Power Commission. The plans for development were essentially those outlined in the 1942 Corps of Engineers engineering study. The Federal Power Commission dismissed the power-authority application, holding decision in abeyance pending reconsideration of the matter by Congress and recommended Federal construction of the power project.

In June 1949, the General Engineering Branch, Department of Transport (Canada), issued its final engineering report on the navigation phase of the St. Lawrence Seaway.

Even though the Canadian Secretary of State for External Affairs expressed concern over the delay by the United States in approving the Executive Agreement of 1941, and the President in several messages to Congress again urged construction of the project, it was not approved by the Congress. The Prime Minister of Canada was quoted on January 28, 1949, as saying that Canada would consider building the power phase of the project alone because of great value of the power.

A treaty was concluded with Canada in 1950 dealing with the redevelopment of Niagara Falls hydroelectric power, and other matters which had originally been contained in the Executive Agreement of 1941 and had been major factors in preventing approval of the latter. The treaty was proclaimed October 10, 1950, following ratification by the Senate.

During April and May 1950 the House Committee on Public Works heard only proponents on a bill to authorize the St. Lawrence project, but no action was taken. The following year, after lengthy hearings on a group of similar bills to authorize construction of the St. Lawrence Seaway, the committee voted 15 to 12 not to take further action. An unsuccessful attempt was made to authorize the seaway by an amendment to the foreign aid bill. The same committee held hearings in 1951 on a number of bills proposing construction of the seaway, but failed to act.

The Senate Committee on Foreign Relations considered several bills in 1952 designed to approve the 1941 Executive Agreement.

However, the bill reported to the Senate without recommendation was sent back to the committee which took no further action.

During negotiations leading to the Niagara Treaty, the Canadian Government let it be known that Canada was prepared to proceed with an "all-Canadian seaway" as far west as Lake Erie, once the means had been found for joint construction by the power project in the International Rapids section.

This was followed in December 1951 by Parliamentary action in Canada approving two separate acts authorizing the construction of the seaway and the power project:

1. The St. Lawrence Seaway Authority Act authorized the construction of navigation works with a prevailing depth of 27 feet on the Canadian side of the river from Montreal to Lake Ontario and improvement of the Welland Canal to conform to the 27-foot prevailing depth.

2. The International Rapids Power Development Act authorized the Hydroelectric Power Commission to join a U.S. power-generating entity in constructing the necessary power works in the International Rapids section of the St. Lawrence River.

In June 1952 a joint application was made by Canada and the United States to the International Joint Commission for the development of power in the International Rapids section. Canada agreed to build all of the navigation facilities on the Canadian side from Montreal to Lake Erie.

The International Joint Commission gave its approval in October 1952. However, it was not until June 7, 1954, that the issuance of a 50-year license by the Federal Power Commission in November 1953 to the Power Authority of the State of New York successfully withstood challenge in the courts and the power project could proceed. In March of 1954 the Power Authority of the State of New York had reorganized and arrangements had been made, under the new chairman, Robert Moses, to borrow money and accelerate detailed planning for the power project. After the court ruling, action was begun at once.

In January 1953 Senator Alexander Wiley and Representative George Dondero introduced bills to authorize construction of the seaway. Following hearings by a subcommittee, under the chairmanship of Senator Wiley, the Senate committee, by a vote of 13 to 2 reported favorably a new bill. The bill provided for creation of a St. Lawrence Seaway Development Corporation to construct navigation facilities in the International Rapids and Thousand Islands sections, the costs of which were to be liquidated from the proceeds of toll charges. Cooperation with Canadian authorities was directed in the design, construction, operation, and maintenance of the seaway. The Senate approved by a vote of 51 to 33.

The House Committee on Public Works held hearings on Representative Dondero's bill and several others in June 1953, but took no action until it had received the Senate-approved bill. This it endorsed by a vote of 23 to 6 on February 19, 1954. On May 6, the House approved by a vote of 241 to 158 and the Senate agreed to a House amendment the following day. The President signed the bill May 13, 1954, thus bringing to an end a long, complex, and sometimes tedious legislative battle to authorize construction of the seaway.

III

DESCRIPTION OF THE ST. LAWRENCE SEAWAY

From Montreal to Lake Ontario the St. Lawrence ascends 225 feet. This 182 miles is normally divided into the following units:

Canadian section: 68 miles from St. Regis to Montreal, Quebec. This stretch includes Lake St. Francis, Beauharnois, Lake St. Louis, and La Prairie Basin.

International Rapids section: 46 miles from Chimney Point to St. Regis, Quebec (below Massena, N.Y.).

Thousand Islands section: 68 miles from Lake Ontario to Chimney Point below Ogdensburg, N.Y.

In addition there is the 27-mile Welland Canal which overcomes the 326-foot differential between Lakes Ontario and Erie.

Lachine section (31 miles)

Just east of the Jacques Cartier Bridge at Montreal, Quebec, is the beginning of the St. Lawrence Seaway. From here to the Atlantic the St. Lawrence has a maintained minimum depth channel of 35 feet.

A protecting dike begins at this point off the southern shore and extends 3 miles upstream to the first lock, located at the south end of Victoria Bridge. This is St. Lambert lock, which provides a lift of 15 feet from Montreal Harbor level to that of the 8½-mile-long La Prairie Basin. At the upstream end of the basin is located the second lock, Cote Ste. Catherine, which is 730 feet long, 80 feet wide, and 27 feet deep and lifts vessels 30 feet to the level of Lake St. Louis, which is 7½ miles upstream. Lake St. Louis is a wide stretch in the river through which a dredged channel of 27 feet is provided. The channel is 200 feet wide where there are embankments on both sides, 300 feet wide where embankment exists on only one side, and in open reaches a width of 450 feet is available. It is for the purpose of bypassing Lachine Rapids that this stretch of lateral canal and locks, 18 miles in length, is provided. At the upstream end of Lake St. Louis the Soulanges section is entered.

Soulanges section (16 miles)

Two locks, Upper and Lower Beauharnois, with lifts of 41 feet each, together with the Beauharnois Canal, enable the navigation channel to bypass the Soulanges Rapids.

Lake St. Francis section

Through a wide stretch of the St. Lawrence, which has been called Lake St. Francis, a 27-foot channel has been dredged to the international boundary at the lower end of the 44-mile International Rapids section.

International Rapids section (44 miles)

Just upstream from St. Regis there are two 5-mile dredged channels, on the north and south side of Cornwall Island. The south channel proceeds upstream through the Bertrand H. Snell lock, with a lift of

45 feet; the Dwight D. Eisenhower lock, with a lift of 38 feet; and the 10-mile Wiley Dondero Canal connecting them. This channel, which has been newly excavated to a depth of 27 feet, enables the waterway to bypass the Robert H. Saunders and Robert Moses power dam located between Massena, NY., and Cornwall, Ontario. The Eisenhower lock provides a lift to reach the level of Lake St. Lawrence, the body of water impounded behind the power dam and Long Sault Dam which is a water level control structure.

In this section of the seaway, islands were removed and points of land lopped off to make way for the channel. Dikes were erected to protect surrounding countryside from any possible damage by high water.

At the western end of Lake St. Lawrence is located the Iroquois Dam and lock (Canadian) which is a control structure built by Canada instead of the Point Rockway Dam which was originally planned for construction by the United States. The 1½-mile canal above the lock flows into the river again west of Iroquois, where the channel then enters the Thousand Islands section.

Through the 68-mile Thousand Islands section the United States has provided a dredged channel of 27 feet to Lake Ontario.

Connecting Lakes Ontario and Erie is the 27-mile Welland Canal, incorporating seven locks with a total lift of 326 feet, and now improved to conform to seaway standards. The canal transits navigation around Niagara Falls and the Niagara River Gorge.

A. Work Division, Lake Erie to Montreal Seaway

The following is a breakdown of the principal construction features completed by both countries.

WORK DONE BY THE UNITED STATES

Thousand Islands section

Channel enlargement between Clayton, N.Y., and Oak Point, N.Y.

International Rapids section

(1) Construction of the 10-mile Long Sault Canal with its two locks, the Dwight D. Eisenhower and Bertrand H. Snell, and appurtenant works, including dikes near Massena, N.Y. This canal bypasses the power project's principal structures.

(2) Construction of the superstructure of the new International Highway Bridge across the south channel at Cornwall Island.

(3) Channel enlargement in the South Cornwall Channel.

(4) Ancillary work, including installation of navigation aids in U.S. waters throughout the Thousand Islands and International Rapids sections.

WORK DONE BY CANADA

Welland Canal

Channel enlargement in the canal approaches as well as in the canal proper between existing locks.

Thousand Islands section

Channel enlargement where necessary in the lower sector.

International Rapids section

(1) Construction of the 1½-mile Iroquois Canal and lock, which bypasses the power project upper control dam.

(2) Construction of the substructure of the new International High-Level Highway Bridge across the south channel at Cornwall Island.

(3) Channel enlargement in the north and south channels at Cornwall Island.

Canadian section

(1) In Lake St. Francis, channel enlargement where necessary.

(2) Modification of existing bridges across the 16-mile Beauharnois power (seaway) canal. Channel enlargement in this canal as necessary. Construction of a short section of new canal with two locks, upper Beauharnois and lower Beauharnois. Appurtenances to carry navigation around the powerhouse at the lower end of the already existing canal.

(3) On the south side of the river, opposite Montreal, construction of an 18-mile lateral (LaPrairie Basin) canal containing two locks, Cote Ste. Catherine and St. Lambert to bypass the Lachine Rapids. In addition appurtenant work including major bridge and utility alterations.

Basic dimensions

Controlling channel depth	27 feet.
Controlling channel bottom width (open-river reaches)	450 feet.
Normally these dimensions are at least 600 feet. Bottom width in lateral canals varies from 192 feet in the Welland Canal to 442 feet in Long Sault Canal.	
Maximum current anticipated in dredged cuts	About 4 feet per second (2.7 miles per hour).
Locks:	
Number of lift locks requiring transit	14.
Length between gate hinges generally	860 feet.
Controlling inner length, gate to fender	768 feet.
Width	80 feet.
Sill depth	30 feet.
Lift per lock (varies)	4 to 48 feet.
Controlling bridge clearances:	
Horizontal	200 feet.
Vertical	120 feet.

B. Toll Charges

Legislation authorizing the construction of the St. Lawrence Seaway by the U.S. Congress and by the Canadian Parliament instructed the construction agencies of the two nations to institute a system of tariff charges for use of the seaway. They were to be set at a rate which would encourage the fullest use of the seaway and at the same time return sufficient income to repay the costs of construction within a period of 50 years (including interest) and to defray the costs of annual operation and maintenance.

In 1955 the St. Lawrence Seaway Authority and the St. Lawrence Seaway Development Corporation each appointed representatives to

a Joint Tolls Committee to study the tariff system. The Committee had two objectives before it:

1. Procedural simplicity which would minimize the cost of collection and expedite the dispatching of vessels.

2. Recovery of the cost of the seaway and its operation on a basis which would provide economical rates to users and encourage traffic.

Careful consideration was given to economic forecasts of expected traffic. Following the study, public hearings were held in September 1957.

The Joint Tolls Committee submitted a unanimous report to their parent organizations on June 12, 1958. Following public discussion and a few interpretive additions the schedule was adopted by an exchange of notes between the two nations on March 9, 1959, and became effective with the beginning of the navigation season of 1959.

Tariffs outlined in the schedule will apply to all types of craft using the seaway, including Government-owned or Government-operated vessels, except those owned or used by the seaway entities.

Before passage is permitted, vessels must be registered and satisfactory security for tolls must be posted. Toll collections and invoicing of accounts, as well as the preparation of statistical data, are assigned to the St. Lawrence Seaway Authority at Cornwall. The St. Lawrence Seaway Development Corporation will participate in the billing and collecting operation, and will share in the annual cost of these services. Charges will be billed to the ship owner or representative promptly and will be payable within 14 days of the date of billing.

For through passages either way tolls are divided into two parts: (1) Canadian funds payable to the St. Lawrence Seaway Authority of Canada. This amount has been set initially at 71 percent of the total charges; and (2) the balance of the account, or 29 percent, in U.S. funds, payable to the St. Lawrence Seaway Development Corporation. Tolls for passage of the Welland Canal will be paid in Canadian funds to the Canadian Authority. The memorandum of agreement on tolls provides that—

> these percentages shall be adjusted from time to time so that the Authority and the Corporation shall receive, during the term of the tariff, a proportion of the tolls in the ratio of their respective annual charges (for operation, maintenance, interest and retirement of debt), to their combined annual charges in respect of the said portion of the St. Lawrence Seaway * * *.

A Joint Tolls Advisory Board, consisting of two representatives from each agency, will hear complaints over the interpretation of the tariff by either body, or about the alleged unjust discrimination arising out of the operation of the tariff. The Board will report its findings to the parent organizations.

The two agencies are charged with the duty of reporting to their respective Governments not later than July 1, 1964, concerning the sufficiency of the authorized tolls to meet the statutory requirements.

Toll charges schedule

	Montreal to or from Lake Ontario	Lake Ontario to or from Lake Erie (Welland Canal)	Complete transit total
1. For transit of the seaway, a composite toll, comprising—			
(1) A charge per gross registered ton, according to national registry of the vessel, applicable whether the vessel is wholly or partially laden, or in ballast	$0.04	$0.02	$0.06
(2) A charge per ton of cargo, as certified on ship's manifest or other document, as follows:			
Bulk cargo	.40	.02	.42
General cargo	.90	.05	.95
(3) A charge per passenger	3.50	4.00	7.50
(4) Minimum charges, subject to the provisions of subitems (1), (2), and (3) above:			
Pleasure craft	14.00	16.00	30.00
Other vessels	28.00	32.00	60.00
2. For partial transit of the seaway:			
(1) Between Montreal and Lake Ontario, in either direction, 15 percent per lock of the applicable toll;			
(2) Between Lake Ontario and Lake Erie, in either direction (Welland Canal), 50 percent of the applicable toll; no toll to be assessed unless at least 1 lock is transited, or with respect to lock 1 of the Third Canal at Port Dalhousie, Ontario.			
(3) Minimum charges:			
Pleasure, $200 per vessel per lock transited;			
Other vessels, $4 per vessel per each lock transited.			

IV

ST. LAWRENCE POWER PROJECT

The stability of waterflow in the St. Lawrence River makes it an excellent source for the development of hydroelectric power. With a minimum flow of one-half of its maximum the St. Lawrence is one of the most dependable rivers in the world.

On August 10, 1954, two official ceremonies took place, in which the Governor of the State of New York joined with the Prime Minister of the Dominion of Canada and the Prime Minister of the Province of Ontario in initiating construction. A blast of dynamite at the Long Sault Dam site on the U.S. side and sod turning at the site of the powerhouse near Cornwall, symbolized the beginning of the huge power project. Four years later the project was officially opened.

The Power Authority of the State of New York and the Hydroelectric Power Commission of Ontario jointly developed and jointly operate the power project.

Construction

Cofferdams were constructed to make it possible to dewater and excavate the power-dam area. Excavation was begun in June 1955 and later in the year channel improvements were undertaken to improve hydraulic and navigation conditions. Relocation of transmission lines on both sides of the river was necessary, as well as relocation of Ontario Hydro's Cornwall Transformer Station.

By midsummer of 1955 the power authority was engaged in excavation of Long Sault Dam, the American powerhouse, and Iroquois Dam. Most of that was completed by the end of the year. In 1956 authority contractors did considerable work on transmission lines, road, and railway relocations, and bridge construction. Dikes and channel improvements were begun.

In 1957 permanent structures were well underway and a start was made on installing the turbines, generators and other equipment at the powerhouse site. Virtually all dikes were completed in that year. Approximately 18 miles of them were required to supplement the concrete structures in holding back the waters of the 100-square-mile power pool. Flooding of the headpond was scheduled for July 1958.

To generate power from the International Rapids section, it is necessary to utilize the drop in the water level between the eastern end of Lake Ontario and the powerhouse site. Because it is spread over a 125-mile stretch of the river, this drop, which has a mean of 92 feet, was of little value for power purposes until it could be concentrated at one point. By effective use of control structures the power pool could be created immediately above the powerhouses to produce an operating head of 83 feet. The order of approval of the International Joint Commission provided that the forebay water

level would be operated at a maximum elevation of 238 feet above sea level at the beginning.

Before the pool could be flooded, inhabitants of the flooded area had to be relocated. Twenty thousand acres on the north or Canadian side and 18,000 acres on the south or American side were to be flooded. On the latter side only 225 farm families and 500 cottage owners were displaced. However, in Canada, 7 communities and part of an eighth were involved, populated by about 6,500 persons. These communities were Iroquois, Aultsville, Farran's Point, Dickinson's Landing, Wales, Moulinette, Mille Roches, and one-third of the town of Morrisburg as well as some rural communities. Three new communities were created; new Iroquois, Long Sault, and Ingleside. In Morrisburg, a new subdivision and a business center were built to accommodate that portion of the village affected. This complex operation was carried out by Ontario Hydro. Homes were moved and new ones constructed, together with all of the necessary community facilities, including roads, waterworks, and sewage works. This extensive undertaking was completed by December 1957.

Both power entities had serious problems involving relocation of roads, railways, bridges, and cemeteries. However, costs were shared equally for this as well as for actual construction and excavation and dredging.

The area surrounding the power project has been neatly landscaped; parks and roads enhance the natural beauty of the surroundings. A portion of the area, 1,100 acres on Barnhart Island and 1,600 acres on the mainland has been set aside as St. Lawrence State Park, to be administered by the Thousand Islands Park Commission. Roads, picnic areas, marinas, beaches, and other facilities for visitors have been provided. Canadian authorities have connected nine new islands in Lake St. Lawrence by a scenic drive, known as Long Sault Parkway. Ample provisions have been made for visitors.

On July 1, 1958, Inundation Day (or Dominion Day) was celebrated, when the last obstacle was removed with proper ceremonies and the power pool began to fill. Four days later the first power was generated. All the power to be generated by the first 16 generators of the Power Authority has been sold and the rest contracted for.

Effects of the Power Project

The power project has already had a stimulating effect on the economy of the St. Lawrence Valley on both sides of the border. Since the project started, many new business enterprises have been established and many new homes built for a steadily increasing population.

In the vicinity of Massena, N.Y., the Reynolds Aluminum Co. is constructing a $100 million plant which will employ more than 1,000 workers. The Chevrolet Co. is building a $15 million automotive parts plant to employ 700 workers. Other plants are planned for the area, all attracted by an assured supply of low-priced power. U.S. power from the St. Lawrence is being supplied to Vermont; Alcoa; Plattsburg City, and U.S. Air Force Base; two utilities, Niagara Mohawk and New York Gas & Electric Co.; as well as towns, villages, and rural cooperatives over a wide area.

Ontario Hydro's share is fed through the southern Ontario and northeastern interconnected systems which serve low-cost power to 150,000 square miles of the province.

Principal Structures of the Power Project

Powerhouses

The Power Authority's Robert Moses Power Dam and the Ontario Hydro Robert H. Saunders-St. Lawrence Generating Station stretch from the Canadian mainland to the eastern end of Barnhart Island. The maximum capacity of the 32 generators is 1,880,000 kilowatts. The generators are not housed in a conventional superstructure but are protected by removable hatch covers. It is actually one building 3,300 feet long, 67 feet high, designed to contain 32 generators and produce 2,200,000 horsepower of electricity (1,880,000 kilowatts), divided equally between the two power entities.

Long Sault Dam

The dam is some 3 miles upstream from the powerhouses. It stretches from the western end of Barnhart Island to the mainland of the United States. A curved axis, concrete, gravity, spillway structure, it is 2,960 feet long and at maximum height is 145 feet above the foundation. Its functions are to combine with the powerhouse to maintain the head of water required to operate generators and pass excess flow. It has 30 gates, 50 feet wide.

Iroquois Dam

Spanning an area between the Point Rockway in the United States and Iroquois Point in Canada, the dam is 25 miles upstream from the Long Sault Dam. It is a straight-line, buttressed, gravity-type structure, 2,540 feet long and 67 feet high. Its function is to control outflow of water from Lake Ontario by means of 32 openings between piers, whose vertical-lift gates are operated by 35-ton traveling gantry cranes.

Massena intake structure

To avoid interference with aluminum production at Alcoa and the water supply of Massena, N.Y., a dam was constructed across the Massena power canal and equipped with a pumping station. For more than half a century the canal has diverted water from the St. Lawrence to the Grasse River, providing the head for Alcoa's hydroelectric plant. Upon completion of the development, Alcoa will receive all needed energy from the St. Lawrence power project and the water thus reverting to the main river will produce twice as much power as before because of the increased head at the power dam.

Dikes

Dikes are located intermittently along the New York State shoreline, starting at the powerhouse and extending west; and along the Ontario shore north and west of the powerhouse. A total of 18 miles of dikes have been built. The purpose is to contain the new headpond, or water storage area, necessary for the operation of the powerhouse.

Materials required for completion of all structures

Concrete	cubic yards	3,200,000
Sand	tons	2,000,000
Structural steel	do	28,000
Gates, hoists, and cranes	do	20,000
Reinforcing steel	do	59,300
Cement	barrels	3,600,000

Costs

Robert Moses Power Dam	$85,400,000
Transmission Plant	12,900,000
Long Sault Dam	40,200,000
Iroquois Dam	22,500,000
Massena intake	12,450,000
Channel improvements	48,200,000
Dikes, reservoir clearing, temporary construction, engineering, general and administrative expenses	37,919,000
Total, for construction	259,569,000
Land and land rights	36,400,000
Interest, financing costs and working capital during construction	56,263,000
Less reimbursement from Ontario Hydro (shared costs) power revenues during construction and credit for navigation (from Canada)	−17,232,000
Total, bond issue	335,000,000
Remaining:	
Barnhart-Plattsburg transmission project	7,250,000
Supplemental transmission work	6,800,000

Physical quantities

Area of watershed	square miles	298,080
Average annual flow without diversions	cubic feet per second	244,400
Average head of main plant	feet	81
Dependable capacity	kilowatts	1,400,000
Maximum capacity installed	do	1,800,000
Annual energy output	kilowatt-hours	13,000,000,000
Primary annual energy output	do	10,400,000,000
Number of generating units		32
Capacity of each unit	kilowatts	57,000
Estimated cost	dollars	650,000,000

V

THE FUTURE OF THE SEAWAY

Traffic through the new seaway facilities is expected to be of the same general character as that which has been passing through the old St. Lawrence canals and the Welland Canal. It is estimated that 10 to 12 percent will be general cargo, and the balance bulk cargo, largely made up of iron ore, grain, coal, petroleum products, and forest products.

It is anticipated that on the opening of the new seaway facilities, the cargo tonnage will be between 25 million and 30 million tons a year, or about double that passing through the old St. Lawrence canals. The increase will derive primarily from a greater volume of iron ore and grain, and other bulk products. Subsequent increases in traffic are expected to bring the total to 50 million tons a year by the end of a 10-year period. Similarly, for the Welland Canal, the traffic is expected to rise from 23 million tons yearly to 40 million tons soon after the opening of the entire seaway, and will reach its maximum capacity of 60 million tons after 10 years.

The improved waterway provided by the seaway, with its fewer but larger locks, will stimulate growth and development in the heartland of Canada and the United States. The major ports of the two nations have developed plans for far reaching improvements in their port facilities and the channels approaching their harbors. This will be necessary to enable them to receive, load and unload, and dispatch the larger vessels which can utilize them.

Savings to shippers are anticipated in the important grain trade of Canada and the United States. The extent of the savings will depend on many factors, including the development of a new type of ship which might make the entire trip and thus avoid transshipment, and the use of larger ships than the present lakers to utilize new grain elevators now being built far to the east of the present centers of such trade. The grain trade from the great producing areas of the western plains, American and Canadian, could realize great savings, depending on the vigor with which those engaged in the trade pursue their opportunities, and how competing transportation and handling agents meet the competition.

Another bulk product, iron ore, going primarily in the opposite direction, also offers great opportunities for savings and stimulation of trade. It is believed that Labrador-Quebec ore can be placed competitively in the Great Lakes area as far west as Toledo.

However, while the potential for growth and stimulation of industry and commerce is there, the seaway will not of itself bring great prosperity to the Great Lakes area. Those who would profit thereby will of necessity be required to make a great effort in concrete fashion. Port facilities, now being planned, will not be of any use until they are actually put into operation. Services, such as insurance, ship supplies, freight-forwarder services, banking, and many other services

must be made available. Scheduling of sailings depend upon the availability of cargoes. Exports and imports should be somewhere near balance. And above all it must be possible to service the port areas with transportation and warehousing facilities. This may call for entire new industries, or a redirection or reorientation of present patterns.

The ultimate value of the St. Lawrence Seaway to two great nations will depend upon the vigor and enterprise with which the great industrial centers of the two countries seize the rich opportunity here presented.

APPENDIXES

APPENDIX I.—*St. Lawrence seaway and power projects chronology*

1783—First canal completed between Montreal and Lake St. Francis.

1824—Welland Canal bypassing Niagara Falls begun by private interests. Opened in 1832 with 7-foot depth. Taken over by Canadian Government in 1841 and improved to 9 feet; to 10 feet in 1853; to 14 feet in 1887.

1842—Webster-Ashburton Treaty fixed northeastern boundaries of the United States. Opened the waterway of the St. Lawrence to the Great Lakes to free navigation by both countries.

1871—Treaty of Washington confirmed the right of the United States to navigate the St. Lawrence from the international boundary to the sea.

1888—U.S. Army Corps of Engineers survey of possible routes to connect Lake Ontario and Lake Erie on the American side.

1895—United States and Canada appoint a Deep Waterways Commission to report on all possible water routes which might connect the Great Lakes and the Atlantic. Report of the American section (1897) concluded that both the St. Lawrence and Mohawk Canal routes were feasible. Estimates of cost of an All-American route for a St. Lawrence Canal submitted by the Chief of Engineers.

1901—St. Lawrence system of canals improved to 14-foot minimum depth.

1909—International Boundary Treaty between the United States and Canada established an International Joint Commission to rule on matters affecting the boundary waters between the two nations.

1911—U.S. House of Representatives, Committee on Rivers and Harbors, considers proposal for improvement of St. Lawrence River for navigation in vicinity of Long Sault Island, N.Y.

1913—U.S. Senate adopted resolution requesting the President to enter into negotiations with Canada for an international agreement for improvement of navigation in Untied States-Canadian boundary waters.

1914—U.S. note to Canada suggesting submission to the International Joint Commission for study the question of development of boundary waters for navigation and power. Canada did not reply.

1919—Great Lakes-Tidewater Association in the United States and the Canadian Deep Waterways and Power Association organized. Private organizations for the purpose of urging construction of a St. Lawrence Seaway from the Great Lakes to the sea.

1921—International Joint Commission recommends joint United States-Canada project from Montreal to Lake Erie, including the Welland Canal. Costs to be divided on the basis of benefits.

1923—President Coolidge, in annual state of the Union message to Congress recommends construction of seaway. Every President following him favored construction of the project.

1926—Report of Joint Board of Engineers favored a 25-foot channel and full power development at an estimated cost of $625 to $650 million. United States favored a single-stage development with power dam at Barnhart Island; Canada a two-stage project with dams at Morrisburg and Cornwall.

Report of St. Lawrence Commission recommended St. Lawrence route for seaway, urging immediate construction, with power to be developed by proper agencies, further negotiations with Canada leading to cooperative effort, and recognition of the proper relationship of the State of New York to power development in the International Rapids section.

1927—U.S. Department of Commerce report favoring 27-foot depth of navigation channel. Estimated commerce available for use of waterway at 19 to 24 million long tons per year.

Joint Board of Engineers offered a third alternative, a two-stage development, placing upper dam at Crysler Island. Later offered a compromise two-stage plan for the International Rapids section.

1928—Canada proposes a 27-foot channel project. Welland Canal to be a purely Canadian component.

1931—New York State creates Power Authority of the State of New York, to develop hydroelectric power in the International Rapids section.

1932—Final report of Joint Board of Engineers served as basis for negotiation of United States-Canadian Treaty of 1932 agreeing to joint construction of the St. Lawrence Seaway and power projects. Recommended a 27-foot channel and two-stage development of power.

Dominion of Canada and Province of Ontario reach accord on latter's development of power in International Rapids section.

United States and Canada negotiate treaty providing for joint construction of seaway and power project.

Welland Canal improved to channel of 25 feet and 30 feet over sills of locks.

1934—Senate fails to approve treaty of 1932 by a vote of 46 ayes and 42 nays.

1936–38—Negotiations on a new treaty to authorize construction of St. Lawrence Seaway and power project. The two nations failed to reach agreement.

1941—Executive Agreement, United States and Canada, provided for construction of works in the International Rapids section and completion of navigation improvements in the other sections of the Great Lakes-St. Lawrence system by 1948. Would require concurrent legislation.

1942–52—Numerous attempts to obtain congressional approval of Executive Agreement. All failed.

1942—Final engineering report of Corps of Engineers on the St. Lawrence River project, with slight alterations in 1946, became basis for actual construction of project calling for a 27-foot channel and a single-stage power development.

1946—During congressional hearings on resolution to approve the Executive Agreement of 1941 the first proposal that the project be made self-liquidating by means of power revenues and toll charges on users of the waterway.

1947—Canada announces agreement with the principle of self-liquidation.

1948—Power Authority of the State of New York and the Hydroelectric Power Commission of Ontario make joint application to the International Joint Commission for an order of approval of the project for the development of hydroelectric power in the International Rapids section.

1949—Canada expresses desire to complete the seaway if the United States is unwilling to cooperate.

1950—Treaty, United States and Canada, on preservation of Niagara Falls and redevelopment of hydroelectric power.

1951—Canadian Parliament establishes the St. Lawrence Seaway Authority for the purpose of cooperating with the United States in constructing the navigation works in the International Rapids section and all such works integral to a St. Lawrence Seaway in Canadian territory. Also approved agreement between the Dominion Government and the Province of Ontario for the power authority of the Province to undertake power development in the International Rapids section in cooperation with the Power Authority of the State of New York.

1952—October 29: International Joint Commission issues order of approval for joint construction of hydroelectric power in International Rapids section, stipulating power development is not to interfere with navigation.

November 4: Canadian note calling attention to obsolescence of 1941 Executive Agreement, declaring it ineffective.

1953—January: Representative George Dondero and Senator Alexander Wiley introduce bills in House and Senate respectively to authorize construc- of St. Lawrence Seaway.

July 15: U.S. Federal Power Commission issues opinion and order to Power Authority of State of New York authorizing construction of power project.

November 4: President of the United States designates the Power Authority of the State of New York as the agent of the United States for construction of the power project referred to by order of approval of the International Joint Commission dated October 29, 1952.

November 12: United States and Canada agree on establishment of Joint Board of Engineers to act as a board of review, coordination, and approval of all construction phases of construction programs in the International Rapids section.

1954—May 6: Canada indicates willingness to cooperate with United States in construction of St. Lawrence Seaway.

May 13: Wiley-Dondero Act, signed by the President, provides for construction of seaway in United States territory by the St. Lawrence Seaway Development Corporation which was given authority to issue $105 million of bonds to finance construction, interest paying, and to be held by the U.S. Treasury. Bonds to be paid off in 50 years from the proceeds of toll charges on users of the waterway; the latter to also provide for operation and maintenance costs.

June 9: Executive order places St. Lawrence Seaway Development Corporation under the direction and supervision of the Secretary of Defense.

August: St. Lawrence Seaway Authority (Canada) organized to construct Canadian facilities for navigation.

August 6: Power Authority of the State of New York and the Hydroelectric Power Commission of Ontario agree on rehabilitation of more than 6,000 persons dispossessed by the power pool at an approximate cost of $65 million on the Canadian side and $13 million on the U.S. side.

August 10: Construction work begun on power project.

August 17: Exchange of notes between the United States and Canada on procedures to be followed in construction of navigation works.

September 2: U.S. Army Corps of Engineers designated as design, construction, and contracting agent of St. Lawrence Seaway Development Corporation; subject to the direction, supervision and control and prior approval of the Corporation.

October 20: First contract let by St. Lawrence Seaway Authority for Canadian navigation works.

November 23: St. Lawrence Seaway Authority and St. Lawrence Seaway Development Corporation agree on procedures, coordination and cooperation in construction of navigation works by the two agencies.

1955—January 18: St. Lawrence Seaway Development Corporation awards first contract.

February: United States and Canada reach agreement on deferment of Point Rockway Canal and lock originally scheduled for construction by the United States. In lieu thereof Canada to construct Iroquois Canal and lock on opposite side of the river.

March: United States and Canada appoint members of Joint Committee to initiate toll studies.

April 11: First ground broken for U.S. seaway works at Long Sault Canal and locks.

1956—March 21: Congress authorizes improvement of connecting channels of the Great Lakes above Lake Erie from the present upbound 21-foot and downbound 25-foot depths to at least 27 feet, at a cost of approximately $130 million. Major works authorized in Detroit River, Lake St. Clair, St. Clair River, St. Mary's River, and Straits of Mackinac. Scheduled for completion in 1962.

June 3: Robinson Bay lock formally dedicated in the name of President Dwight D. Eisenhower.

December: Revised estimates of cost of construction of U.S. navigation works sets at $133 million.

July 17: St. Lawrence Seaway Development Corporation's authority to incur bonded indebtedness increased to $140 million.

1957—September: Public hearings held by Joint Tolls Committee.

December: Estimated cost of U.S. navigation works revised to $123,669,900.

1958—April: Canadian lock at Iroquois open to navigation.

July 2: Eisenhower and Snell locks completed and dedicated.

June 12: Joint Tolls Committee reports to respective parent organizations. Representatives in complete agreement.

July 4: First transit of U.S. locks and channels at Long Sault; 14-foot canals abandoned.

September 5: First power delivered at Robert H. Saunders-Robert Moses power dam; formal dedication of power project.

September 13: Wiley-Dondero Ship Channel dedicated.

December 9: St. Lawrence Seaway Development Corporation terminates delegation of authority to Corps of Engineers, effective December 31, 1958.

1959—February 25: United States and Canada agreement on toll charges for use of seaway approved by the President.
Apr. 25: Opening of navigation for the entire seaway. Complete except for limited depths in a few areas at about 25 feet, expected to be eliminated by June 1959 when full 27-foot depth will be available throughout.
June 26: President Eisenhower, Her Majesty Queen Elizabeth II of Great Britain, and Canadian officials join in formal ceremonies dedicating the St. Lawrence Seaway.

APPENDIX II.—*Legislative history of Wiley-Dondero Act (S. 2150 of the 83d Cong.)*

SENATE

1953—January 23: S. 589 (Senator Alexander Wiley, of Wisconsin, for himself and for Senators Taft, McCarthy, Green, Aiken, Murray, Chavez, Humphrey, Douglas, Ferguson, Lehman, Young, Tobey, Pastore, Potter, Hill, and Langer). Referred to Senate Committee on Foreign Relations.
February 18: Senate Joint Resolution 45 (Senator Lehman, for himself and others). Referred to Senate Committee on Foreign Relations. Authorized the President to fulfill the undertakings for the development of the boundary waters of the Great Lakes St. Lawrence Basin pursuant to the Boundary Waters Treaty of 1909.
February 23: Chairman of Senate Committee on Foreign Relations appointed subcommittee to consider legislation proposed for the St. Lawrence Seaway: Senators Wiley (chairman), Tobey, Taft, Knowland, George, Green, Sparkman, and Humphrey.
February 25: S. 1065 (Senator Humphrey). Referred to Senate Committee on Foreign Relations. Similar to S. 589, but directed work to be done pursuant to article 3 of the Executive Agreement of March 19, 1941, between the United States and Canada and providing for the deepening of the channels "through the Great Lakes."
April 14, 15, 16, and May 20 and 21: Subcommittee hearings on S. 589, Senate Joint Resolution 45, and S. 1065.
June 3: Subcommittee reports S. 589, as amended, without dissent to the full committee.
June 15: By a vote of 13 to 2 the Senate Committee on Foreign Relations approved S. 589 as amended, and reported to the Senate, recommending passage (S. Rept. No. 441). The amended bill was assigned the number S. 2150.
June 16: S. 2150 assigned to Senate Calendar.
July 6, 16, and 27: Consideration objected to on the floor of the Senate.
1954—January 12–15, 18, and 19: S. 2150 debated in the Senate.
January 20: Amended and passed the Senate by a vote of 51 ayes, 33 nays, and 12 not voting.

HOUSE

1953—January 3: House Joint Resolution 2 (Mr. Kilburn), to authorize construction of the St. Lawrence Seaway project, introduced. Referred to House Committee on Public Works.

January 3: House Joint Resolution 3 (Mr. Dingell), to authorize construction of the St. Lawrence Seaway project, introduced. Referred to House Committee on Public Works.

January 3: House Joint Resolution 4 (Mr. Dingell), to authorize construction of the St. Lawrence Seaway project, introduced. Referred to House Committee on Public Works.

January 7: House Joint Resolution 98 (Mr. Machrowicz), to authorize construction of the St. Lawrence Seaway project, introduced. Referred to House Committee on Public Works.

January 9: House Joint Resolution 104 (Mr. Dondero), to authorize construction of the St. Lawrence Seaway project, introduced. Referred to House Committee on Public Works.

February 18: House Joint Resolution 195 (Mr. Roosevelt), to authorize construction of the St. Lawrence Seaway project, introduced. Referred to House Committee on Public Works.

February 19: H.R. 3319 (Mr. Zablocki), to authorize construction of St. Lawrence Seaway project, introduced. Referred to House Committee on Public Works.

March 9: H.R. 3799 (Mr. Thompson), to authorize construction of St. Lawrence Seaway project, introduced. Referred to House Committee on Public Works.

June 4: House Committee on Public Works voted unanimously to confine its interest to House Joint Resolution 104.

June 11, 12, 15, 16, 17, and 18: Hearings by House Committee on Public Works on House Joint Resolution 104.

1954—January 21: S. 2150 referred to House Committee on Public Works.

February 19: By a vote of 23 to 6 House Committee on Public Works reported S. 2150 to the House, with recommendation that it be approved (H. Rept. No. 1215).

February 22: S. 2150 presented to the House of Representatives.

April 29: House Resolution 523 (calling for consideration by the House of S. 2150) reported favorably to the House (H. Rept. No. 1549).

May 5: House Resolution 523 agreed to by the House.

May 5 and 6: S. 2150 debated in the House, amended, and passed by a vote of 241 to 158.

May 7: Senate concurs in House amendment without a record vote on the motion of Senator Wiley.

May 10: S. 2150 signed by the Speaker of the House.

May 11: S. 2150 signed by the President of the Senate.

May 13: S. 2150 signed by the President of the United States, thereby becoming Public Law 358 of the 83d Congress.

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